

REMARKS

Pending Claims

Claims 11, 16, 21, 24 and 27 have been amended. No claims have been canceled and no new claims have been added. Accordingly, claims 11-12, 14-17, 19-22 and 24-30 are pending in this application. No new matter has been added.

Claim for Priority

Applicants request that the Examiner officially acknowledge the claim for priority and safe receipt of the certified priority document (JP 2000-030217), which was filed in the parent application Serial No. 09/639,755.

Claim Rejections under 35 U.S.C. §103

Claims 11-12, 14-17, 19-22 and 24-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Milligan et al., U.S. Patent No. 5,210,866, and further in view of Bachmat et al., U.S. Patent No. 6,237,063. Applicants respectfully traverse these rejections, and request reconsideration and withdrawal of the rejections for the following reasons.

The claimed invention sets forth data recovery in a computer system or storage system in which stored data is accessed by a host computer. The storage system includes first and second physical storage areas in one or more disks in the storage system and a controller accessing the one or more disks in the storage system. The host computer stores data in a first logical volume by storing the data to the first

physical storage area and a backup copy of the data in the first logical volume is stored to tape at a certain point in time. In the present invention, data recovery is performed after the certain point in time, when a failure in a sequence of processing executed by the host computer occurs. Accordingly, the present invention differs from Milligan in that Milligan is concerned with failure of a disk drive and recovery of the data in the failed disk drive by using a replacement disk drive.

Data recovery in the present invention includes selection of an unused second logical volume in the storage system by the host computer, for example, that corresponds to a second physical storage area of the one or more disks. The backup data is read from the tape to the second physical storage area thereby restoring a copy of the first logical volume at the certain point in time to the second logical volume. The host instructs the controller to relate the second logical volume in the second physical storage area to the first logical volume in the first physical storage area according to a swap request by exchanging positional information of the second logical volume with positional information of the first logical volume.

As set forth in amended claims 11, 16 and 21, the exchanging of positional information of the second logical volume with positional information of the first logical volume results in the data of said first logical volume being interchanged with data of the second logical volume and the controller accessing the second physical storage area when the controller receives an access request to the first logical volume from the host computer. Support for the added limitation is provided in the specification on page 36, lines 19-20.

Further, according to amended claim 24, the exchanging of positional information between the partial logical storage area in the first logical volume and the another partial logical storage area in the first logical volume with each other results in the data in the partial logical storage area in said first logical volume to be interchanged with data in said another partial logical storage area. Support for the added limitation to claim 24 is provided in the specification on page 36, lines 21-23.

Still further, in amended claim 27, the interchanging of the mapping information of the first logical areas of the first logical volume with the mapping information of the second logical areas of the second logical volume results in the first logical areas of the first logical volume to be mapped to the second physical storage areas so that the data in the first logical areas of the first logical volume is interchanged with the data in the second logical areas of the second logical volume and when the host accesses the first logical areas of the first logical volume, the second physical storage areas are accessed. Support for the added limitation to claim 27 is provided in the specification on page 36, lines 21-23.

In Milligan, there is no disclosure of a controller receiving a swap request and of interchanging data of logical volumes or of partial areas of logical volumes as there is in the present invention. Milligan is relied upon in the Office Action for teaching the restoration of data in a logical volume. However, one having ordinary skill in the art recognizes that Milligan teaches identifying a failed physical disk drive and switching a backup physical disk drive into the place of the failed physical disk drive (see col. 3, lines 57-60 of the reference). Reconstructed data is then written onto the substitute

disk drive (see col. 3, lines 67-68). Thus, Milligan teaches replacing a failed disk drive and using redundancy data from other drives in the redundancy group to reconstruct the data of the disk. There is no disclosure by Milligan of selecting an unused second logical volume in the storage system, reading the backup copy of data from a tape to the second logical volume, exchanging positional information of the first logical volume with that of the second logical volume in response to a swap request, and accessing a second physical storage area when the controller receives an access request to the first logical volume from said host computer so that data of the first logical volume is interchanged with data of the second logical volume as a result, as claimed by Applicants.

Bachmat has been cited in combination with Milligan. However, Bachmat does not overcome any of the deficiencies noted above with respect to Milligan. Therefore, combining the teachings of Milligan and Bachmat in the manner suggested in the Office Action does not render obvious the features of the present invention, as recited in claims 11-12, 14-17, 19-22 and 24-30 . Accordingly, reconsideration and withdrawal of the 35 U.S.C. §103(a) rejection of claims 11-12, 14-17, 19-22 and 24-30 are respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not overcome any of the deficiencies noted above with respect to the references used in the rejection of claims 11-12, 14-17, 19-22 and 24-30.

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Conclusion

In view of the foregoing, Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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